regard to continuation classes and to evening classes, this Bill is worthy of the serious consideration of the House. I hope that hon. members will not at this time of the session overload the Bill with amendments.

SCIENTIFIC SERIALS.

Bulletin de la Société des Naturalistes de Moscou, 1886, No. 3. —On two great comets (41 and 42) of 1886, by Th. Bredichin (in French).—On the *Agromyza lateralis* and its metamorphoses, by Prof. Lindeman (in German).—On the iron-bearing mud of Lipetzk, by E. Kislakovsky. It appears much like that of Franzensbad in Germany, and especially that of Ciechocinek in Poland.—On the Ammonites of the group *Olcostephanus versicolor* (Trautschold), by Mary Pavlow (in French, with two plates). Studying a rich collection of *Ammonites versicolor*, some of which reach 8 inches in diameter, while others have the size of a pin's head, the author considers them as belonging to the genus *Olcostephanus*, and establishes the following species, of which the last three are new: *O. versicolor*, *elatus*, *subinversus*, *inversus*, and *coronatiformis*.—On the importance of oxygen for plants, by W. Palladin (summed up in German). An elaborate research into the amount of matter destroyed in consequence of fermentation in an atmosphere devoid of oxygen, as also into the relations between the breathing of plants and their growth.—On the dynamic centra of a rotation-ellipsoid, with relation to earth, by K. Weihrauch, being a mathematical inquiry (in German) from which it results that the centres of attraction are situated in the earth nearer to the centre of figure than would be the case in an homogeneous ellipsoid of the same average density.—On the Algæ of Moscow, by A. Artari (in French), being a continuation of a former publication, and containing a list of eighty-five more species, chiefly Bacillariaceæ.—On the fauna of the lakes of the Slavyansk mineral waters, by P. Stepanoff. The fauna is mixed and contains representatives both of fresh-water and marine species, these latter being chiefly found amidst the Infusoriæ.—The annual report of the Society contains obituary notices of the late President of the Society, Dr. Renard.

No. 4.—Vascular plants of Caucasus, by M. Smirnoff. In this second paper (in French) the nebulosity of different parts of Caucasus is discussed, and data given.—Wild plants of the Government of Tambof, by D. Litvinoff, continued.—The species of *Thrips* living on corn in Middle Russia, by Prof. Lindeman (in German). The new species *Thrips secalina* and *Phlocothrips armata* are described together with former ones.—Zoological researches in the Kirghiz Steppe, by P. Nazarow, being a most valuable review of the fauna of the steppe, especially of its avifauna (with a map).—Speeches pronounced at the death of Dr. Renard.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 16.—"Experiments on the Discharge of Electricity through Gases." (Second Paper.) By Arthur Schuster, F.R.S.

In thinking over the phenomena presented to us in vacuum tubes, I always felt a difficulty owing to our ignorance of the conditions which hold at the surface of bodies, either suspended in or near the discharge, or even at the boundary of the vessel through which the discharge is passing. It is evident enough that if there is a flow of electricity on the surface of a non-conductor that flow must be tangential, but it is not so clear whether we are justified to conclude from this that there can be no normal forces at such surfaces, for it is not necessary that the flow should always take place along the lines of force.

Supposing we suspend two pieces of gold leaf, as in an electroscope, at any place in a partially exhausted vessel, and render them divergent by electrification, they should collapse as soon as the discharge begins to pass, if tangential forces only can permanently exist at their surface. This I have tested by experiment, and found to be the case.

A cylindrical glass vessel 38 centimetres high and 15 centimetres wide, was divided into two approximately equal compartments by a vertical metallic screen. There was an open space of about 5 millimetres between the screen and the sides of the vessel, a space of about 4 centimetres above, and 2·5 centimetres below the screen. One compartment contained two pieces of gold leaf, which could be charged from the outside. The other compartment contained two electrodes about 5 centimetres apart, and 2 centimetres from the screen; these distances could be varied during the experiment. The screen was always conducted to earth, and the electric fields on the two sides of the screen were therefore nearly independent of each other. When the gold leaves were electrified and divergent, and discharges from the induction-coil passed between the electrodes on the other side, no effect could be observed at atmospheric pressure: the gold leaves remained divergent.

At a pressure of about 4·3 centimetres of mercury, the effect I was looking for first appeared; when the discharge passed, the divergent leaves slowly collapsed, and as the pressure was further diminished the collapse took place more and more quickly.

We have here, then, even with the discontinuous discharge, a neutralization of all normal forces at the surface of the gold leaf.

It seemed to me to be interesting to observe more particularly the effects of the ordinary discharges we have at our command, at atmospheric pressure. I took two light balls, and suspended them so that they could be made to diverge by electrification. The electrodes (either spheres or points) of a Voss machine were placed at a distance of 3 inches from each other, and the electrified balls were placed at a distance of 9 inches from the discharge. The results are contained in the following table, in which the first two columns indicate whether the electrodes of the Voss machine were points or spheres. The third column gives the electrification of the balls, and the fourth column the results.

Negative electrode.	Positive electrode.	Balls.	Result.
Sphere	Sphere	Positive	Balls collapse slowly
,,	,,	Negative	,, remain divergent
Point	Point	Positive	,, collapse quickly
,,	,,	Negative	,, remain divergent
Sphere	,,	Positive	,, ,, ,,
,,	,,	Negative	,, collapse slowly
Point	Sphere	Positive	,, ,, quickly
,,	,,	Negative	,, remain divergent

It will be seen that when the two electrodes are similar, whether spheres or points, the balls collapse when they are electrified positively only; but that when one electrode is a sphere and another a point, the balls collapse if their electrification is of the opposite nature to that supplied by the point.

The conclusion thus arrived at, which will be proved beyond possibility of doubt in the second part of this paper, is this: we can only have tangential forces at the surfaces of vessels inclosing a gas through which a discharge is passing, provided no current crosses the surface.

After I had convinced myself that an electrified body placed in a partial vacuum through which an electric current is going, has its electricity quickly neutralized, it was doubtful still whether this neutralization was due to an actual discharge or merely to a covering of electrified particles of an opposite sign. The question is a vital one in all cases where potentials have to be measured. For we can only measure potentials of a gas by measuring the potential of a metal in contact with it; and if an electrified body is covered by electrified particles of a different sign, there is a finite difference of potential between the metal and the gas, and we should have to inquire carefully, in each particular case, how far such a difference would affect our conclusions.

The question is settled by the principal result of this paper:

A steady current of electricity can be obtained in air from electrodes at the ordinary temperature which are at a difference of potential of one-quarter of a volt only (and probably less); provided that an independent current is maintained in the same closed vessel.

In other words, a continuous discharge throws the whole vessel into such a state that it will conduct for electromotive forces which I believe to be indefinitely small, but which the sensitiveness of the galvanometer I used has prevented me from tracing with certainty below a quarter of a volt. There cannot be therefore a finite difference of potential between a gas and a metal in contact greater than that amount.

The same vessel was used as in the previous experiment.

On one side of a screen conducted to earth, were the two main electrodes, from which the current of the large battery passed. On the other side were two auxiliary electrodes connected to the two poles of a small battery. Whenever the main current passed, the small battery was found to send a steady current which could be measured. The smallest electromotive force which was observed to send a current under these conditions was one-sixth of a Leclanché.

An electromotive force of one-sixth of a Leclanche is about one-quarter of a volt, and a current has thus been obtained in a gas from an electromotive force which could not maintain a current through water.

An electromotive force of 0 1 volt gave doubtful results, but this was probably due to the experimental difficulty of detecting the current.

In some previous experiments, which, however, were not quite free from objection on other grounds, the lowest electromotive force for which the currents could be measured was 0·2 volt.

The experimental arrangement which is the best for the qualitative investigation of the effect is not the best for quantitative measurements, and I have therefore not endeavoured to follow out to any great extent the quantitative laws of these currents produced by low electromotive forces. I may give, however, some facts which I have observed. The intensity of the current depends on a great many circumstances.

(1) It increases rapidly with the intensity of the main discharge, and also with a reduction of pressure, as far as I have tried it (that is about half a millimetre).

(2) The intensity of the current from the auxiliary battery increases less rapidly than the electromotive force.

(3) In some experiments, in which one of the electrodes of the auxiliary battery was a copper wire and the other a copper cylinder, the current was nearly always considerably stronger when the larger surface was the kathode.

(4) Anything that facilitates the diffusion of gas from the main current to the auxiliary electrodes will increase the strength of the current observed. In some experiments, in which the screen separating the two fields was made of wire gauze instead of tinfoil, the currents were stronger than those given above.

These experiments show conclusively that there is nothing peculiar in the gaseous state of a body to prevent any electromotive force, however small, to produce a current. If a finite electromotive force is required under ordinary circumstances, the fact cannot be accounted for, as Edlund and others have done, by a special surface resistance which has to be overcome by a finite difference of potential at the surface.

I think the facts are very well accounted for by the theory which I have proposed in my last paper. If the two atoms of a gas making up the molecule are charged with opposite electricities, but are held together in addition by molecular forces, a finite force is required to overcome the latter. But as soon as that force is overcome and the atoms themselves are set free to diffuse and constitute a current, these atoms will be able to follow any electromotive force which we may apply. If, then, we have auxiliary electrodes, these electrodes will establish their electric field, which we can never screen off completely from any other part of the vessel except by closed surfaces. The atoms, with their positive and negative charges, will diffuse across to the auxiliary electrodes and give off their electricity to them. No finite difference of potential is required in the auxiliary electrodes, because, even if there is work done in making an atom interchange its positive for negative electricity, that work is undone again at the other pole, where atoms of a similar kind interchange negative for positive electricity.

I should like, in conclusion, to point out an important application of these results. I have last year obtained by calculation results which seem to show that the principal cause of the diurnal variation of terrestrial magnetism is to be looked for in the upper regions of the atmosphere. Prof. Balfour Stewart at various times suggested that the air-currents in these regions may, owing to the lines of force of terrestrial magnetism, have electric currents circulating in them.

The difficulty against this supposition always seemed to me to lie in the fact that the electromotive forces required to start a current were larger than those which could possibly exist in the atmosphere. But as there are very likely continuous electric disturbances going on, such as we observe in auroræ and thunderstorms, the regions within which these discharges take place would act as conductors for any additional electromotive force however small, so that any regular motion, such as tidal motions, could very well produce periodic effects affecting our magnetic needles.

If these original discharges increase in importance, then, according to the results obtained in this paper, the currents due to the smaller periodic causes would increase also, and they may increase in a very rapid ratio. We know that the electric discharges in the upper regions of the atmosphere are considerably stronger at times of many sunspots, and this may account for the fact that at those times the amplitude of the daily oscillation of the magnetic needle is considerably increased.

I have had considerable assistance in these experiments from my assistant, Mr. Stanton, to whom my best thanks are due.

Geological Society, June 23.—Prof. J. W. Judd, F.R.S., President, in the chair.—The following communications were read:—On nepheline rocks in Brazil, with special reference to the association of phonolite and foyaite, by Mr. Orville A. Derby. The author refers to the phonolites and associated basalts of Fernando Noronha, a deep-sea island off the north-eastern shoulder of the continent of South America. Nepheline rocks of a somewhat different character are abundantly developed on the mainland, and under conditions favourable for throwing light on the relations existing between the granitic type, foyaite, and the other members of the group. There are some mountains near Rio de Janeiro composed of these rocks, as is also the peak of Itatiaia, 3000 metres high, the loftiest mountain of eastern South America. A cursory examination of some of these localities having shown an apparent relation between foyaite, phonolite, trachyte, and certain types of basalt, Mr. Derby determined to visit the Caldas region, where a railway under construction gave unusual facilities for examining this series. A fine development of foyaite, phonolite, and tuff was found, associated with several types that have not yet been met with in the other localities. The existence of a leucite basalt was recognized. The bulk of the paper was devoted to a detailed description of these railway-sections, and the following deductions are drawn:—(1) The substantial identity, as regards mode of occurrence and geological age, of the Caldas phonolites and foyaites. (2) The connexion of the latter through the phonolites with a typical volcanic series containing both deep-seated and aërial types of deposits. (3) The equal, if not greater, antiquity of the leucite rocks as compared with the nepheline rocks, whether felsitic, as phonolite, or granitic, as foyaite. (4) The probable Palæozoic age of the whole eruptive series. The President said it was seldom that a paper containing such important facts was presented to the Society. It was reserved to Mr. Derby to have proved that plutonic rocks containing nepheline (foyaite) passed into volcanic masses which were true phonolites. This Mr. Derby had clearly established by observations in the field. He had also shown that leucite existed in rocks of Palæozoic age, thus rendering untenable the last stronghold of those who insisted on making geological age a primary factor in petrographical classification. He alluded also to the value of the independent determinations of Prof. Rosenbusch. Mr. Bauerman said he had been over portions of the ground with the author, and was glad to add his testimony to the value of the paper. He spoke of the importance, in a geological sense, of these generalizations. It was remarkable how highly crystalline masses of rock pass over into a sort of phonolite. These were associated with Palæozoic masses, which were pre-Permian, or at least pre-Triassic. He alluded to the difficulty of investigating Fernando Noronha, and also to the difficulties attendant upon the investigation of rocks in Brazil, which were subject to such an enormous amount of local alteration. Prof. Bonney also expressed his sense of the value of the paper. He alluded to the comparative rarity of nepheline and leucite rocks, and to the confusion in the nomenclature. He was reminded of the nepheline rocks near Montreal, where dolerite was broken through by nepheline syenite, associated with tephrites and phonolites. Although there might be a doubt here, these rocks were most probably of Silurian age; but the evidence in Brazil was still clearer as to the Palæozoic age, and he believed that, in the case of some other masses, the evidence had satisfied the Canadian geologists. He alluded also to the nepheline rocks in the Katzen-Buckel, where there was a similar passage from coarse-grained to fine-grained. Dr. Hatch said that in this case leucite was clearly shown to be of Palæozoic age, and regarded the paper as a step towards the better classification of this group of rocks. Prof. Seeley asked for evidence as to the identification of the leucite. The President thought there was no possibility of a mistake in this respect. As regards the rocks of the

Katzen-Buckel, none were truly holocrystalline, and hence they could not be compared with foyaite or elæolite-syenite.—Notes on the metamorphic rocks of South Devon, by Miss Catherine A. Raisin, B.Sc. Communicated by Prof. T. G. Bonney, F.R.S.—On the ancient beach and boulders near Braunton and Croyde in North Devon, by Prof. T. McKenny Hughes.—Notes on the formation of coal-seams, as suggested by evidence collected chiefly in the Leicestershire and South Derbyshire coal-field, by Mr. W. S. Gresley.—Note on some Dinosaurian remains in the collection of A. Leeds, Esq.; Part I. *Ornithopsis leedsii*, Part II. *Omosaurus*, sp., by Mr. J. W. Hulke, F.R.S.—Notes on some Polyzoa from the Lias, by Mr. Edwin A. Walford.—On the superficial geology of the southern portion of the Wealden area, by Mr. J. Vincent Elsden. Communicated by the President.—Report on palæobotanical investigations of the Tertiary flora of Australia, by Dr. Constantin Baron von Ettingshausen.—On some new features in *Pelanechtnus corallinus*, by Mr. T. T. Groom. Communicated by Prof. T. McKenny Hughes.—On boulders found in seams of coal, by Mr. John Spencer.

EDINBURGH.

Royal Society, June 6.—Mr. J. Murray, Vice-President, in the chair.—Mr. J. B. Readman read a paper on a furnace capable of melting nickel and cobalt.—Mr. R. Kidston communicated the last part of his paper on the fossil flora of the Radstock series of the Somerset and Bristol coal-fields.—Prof. Grainger Stewart read a paper on investigations into the discharge of albumen from the kidneys of healthy people.—Dr. H. R. Mill communicated the result of his investigations on the salinity and temperature of the Firths of Inverness, Cromarty, and Dornoch, and of the North Sea.—Prof. Ewart discussed the existence of Bacteria in the lymph, &c., of fish and other vertebrates.

June 20.—Sheriff Forbes Irvine, Vice-President, in the chair.—Prof. Geikie communicated a paper by Prof. Frederico Sacco on the origin of the great Alpine lakes.—Dr. E. Sang read a paper on the minute vibrations of a uniform chain hung by one end, and on the functions arising in the course of the inquiry.—Dr. A. W. Hare read a note on the biological tests employed in estimating the purity of water.—Prof. Tait submitted a paper by Mr. A. H. Anglin on alternants which are constant multiples of the difference-product of the variables.

PARIS.

Academy of Sciences, July 11.—M. Janssen in the chair.—Presentation of the minutes of the International Astronomical Congress for the execution of the photographic chart of the heavens, by M. Mouchez. It was stated that although the Congress held in Paris last April concluded its labours before the end of the same month, the publication of its proceedings has been delayed till now, owing to the necessity of sending the proofs for revision to the members scattered over various parts of the world. Two main resolutions were arrived at, the first regarding the adoption of the photographic process, and of a uniform class of instruments, so as to secure the greatest possible degree of homogeneity in the results. The instrument unanimously adopted was that of Gautier, already in use for two years in the Paris Observatory. The second resolution regarded the period and extent of work to be carried out at the various international stations. It was decided that there should be two series of stellar photographs, the first comprising stars to the 11th magnitude approximately, the second to include all down to the 14th magnitude, or about 15,000,000 altogether. A permanent Bureau was also appointed, for the purpose of executing the decisions of the Congress and maintaining constant relations between the members and the Observatories taking part in the work of stellar photography. A special bulletin may also perhaps be issued from time to time, to report generally on the progress of this great astronomic undertaking.—Heat of formation of hydrotelluric acid, by MM. Berthelot and Ch. Fabre. Four determinations effected by the agency of the perchloride of iron in solution, give a mean of 29·12 calories.—On the presence of microscopic crystals of albite in various limestone rocks of the Western Alps, by M. Ch. Lory. The genesis of these crystals appears to have been generally favoured in the Western Alps by the conditions under which the Triassic formations have been developed. They occur somewhat exceptionally in association with the Middle Lias at Villette, and about the head of the long fjord of the Miocene sea, which flowed from the Maritime Alps to a point a little north of Saint-Jean-de-Maurienne. Hence the formation of these microscopic crystals appears to be connected with the special character of the deposits, and to be independent of the more or less intense local mechanical actions which affected the various stratified rocks at the time of the Alpine dislocations.—Presentation of M. Godefroy Malloizel's volume containing a complete list of M. Chevreul's writings issued between the years 1806–86, by M. de Quatrefages. The cost of this publication has been met by the balance of the sum subscribed by the youth of France to strike a medal in honour of M. Chevreul on his hundredth anniversary. Besides the titles and dates of everything issued by M. Chevreul during the last eighty years, careful tables of contents are appended to all memoirs and scientific papers of any considerable length. An introduction is added by M. Desnoyers, Librarian of the Museum, and a fine portrait of the illustrious *doyen* of the *savants* of the whole world, by M. Champollion.—On antipyrine as a substitute for morphine in subcutaneous injections, by M. Germain Sée. The continued experience of the author since his first communication on antipyrine as an anæsthetic (April 18, 1887), shows its decided superiority over morphine in all cases of rheumatic, hepatic, and cardiac affections. It is administered in the same way, but is more easily prepared, more efficacious, and entirely free from the dangerous consequences too often attending the use of morphine.—On a simple dynamic method of determining the degree of isotropy of an elastic solid body, by M. E. Mercadier. According to Saint Venant, in all true solid isotropes $\frac{\lambda}{\mu} = 1$, where λ and μ are two characteristic quantities of a solid body, by means of which may be expressed all the coefficients relative to its elasticity (Lamé). Hence, if this relation can be measured for different bodies, their degree of isotropy may be determined by the difference between the value of such relation and unity. M. Mercadier here supplies a simple method for making this determination based on the theory of the vibrations of circular plaques, the laws of which have recently been verified by him. He shows, for instance, that for glass $\lambda = \mu$; that is to say, that it is an isotropous body. This is an extremely simple confirmation, by a *dynamic* process, of the result of the beautiful experiments made by M. Cornu on glass by a *static* method.—On the alums formed by selenic acid, by M. Charles Fabre. Continuing the studies of Wohlwil, Wöhler, and Petterson, the author here describes a series of selenic alums with alumina or sesquioxide of chromium base, which he has succeeded in preparing. They comprise the alums of alumina corresponding to the general formula $Al_2O_3 . 3SeO_3 + MO . SeO_3 + 24HO$, and the alums of chromium corresponding to the general formula $Cr_2O_3 . 3SeO_3 + MO . SeO_3 + 24HO$.—Researches on the reactions of the vanadates considered from the stand-point of chemical analysis, by M. Ad. Carnot. In this paper the author completes the study of the reactions produced between the vanadates and the chief metallic salts under the ordinary conditions of analysis. Amongst the salts here treated are those of cobalt, nickel, zinc, cadmium, copper, mercury, lead, and bismuth.

BERLIN.

Physiological Society, June 17.—Prof. Du Bois-Reymond, President, in the chair.—Prof. Ewald spoke on the behaviour of salol (salicylate of phenol) in the stomach, a question which he has investigated in order to obtain information as to the movements of the stomach in relation to the time in which the contents of this organ are sent on into the intestine. Prof. Nencki had stated that salol is not acted upon by gastric juice, but is split up into salicylic acid and phenol by the action of pancreatic juice. Prof. Ewald's experiments confirmed the statement that salol undergoes no change in the stomach; thus, after administering salol, this substance could be detected in portions of the contents of the stomach examined at intervals of from one-half to three hours after it had been taken. Pancreatic juice was found to be similarly inert on salol, but on the other hand it was decomposed by most alkaline fluids. When injected into the intestine through a fistula, salol could readily be detected after half an hour, as salicyluric acid, in the urine. Since, therefore, salol undergoes no change in the stomach, but is readily decomposed in the intestine, and appears in half an hour as salicyluric acid in the urine, it was found to be extremely well suited to the purposes of the proposed experiments. When salol is given to healthy men whose gastric apparatus is in a normal condition, whether on an empty stomach, or with food, or at different stages of gastric digestion, salicyluric acid was found in their urine on an average three-quarters of an hour after it had been taken. From the data given above, the salol must have remained one-quarter of an hour in the stomach. In the case of patients suffering from gastric dilatation, the salol remained much longer in the stomach. The time which elapses between the administration of salol and the appearance of salicyluric acid in the urine may hence be used as an important means of diagnosing cases of slight gastric dilatation. After prolonged electrical stimulation of the abdominal muscles, the passage of salol into the intestine was quickened.—Prof. Zuntz criticised a theory of the excretion of carbonic acid in the pulmonary alveoli which has been put forward by von Fleischl, according to which the shock given to the blood by the contraction of the heart is to be regarded as the chief cause of the diffusion of the carbonic acid through the alveolar walls. The speaker refuted this theory as being both unproved and unnecessary.—Dr. Goldschneider communicated the results of his experiments on the reaction-time of the perception of temperature. It has been known for a long time that cold is more quickly perceived than heat. As a starting point, the speaker had first carried out some direct measurements. He sought out portions of the surface of the body which were equally sensitive to heat and cold; these parts were then stimulated as far as possible with equal intensity, and the results were as follows, taken as a mean of about two thousand separate measurements:—The reaction-time for cold as a stimulus is for the face 13·5, for the arm 18, for the abdomen 22, and for the knee 25 hundredths of a second. When an equally strong heat stimulus was applied, the numbers obtained were 19, 27, 62, and 79 hundredths of a second. The ratio of the reaction-times was found to be about the same when the stimuli were applied to such a nerve as the trigeminal which goes straight to the brain and to a spinal nerve. The experiments on thermal stimulation were made by bringing a metallic button in contact with the skin and recording electrically the moment of contact; the resulting sensation was indicated by a Beiss key. The degree of heat and cold employed as a stimulus was selected so as to differ by equal amounts from the temperature of the skin. From the results of the experiments, Dr. Goldschneider deduced some theoretical conclusions as to the nature of our sensations of heat and cold.

Physical Society, June 27.—Prof. von Helmholtz, President, in the chair.—Prof. von Bezold demonstrated the currents, which he has very fully investigated, which occur in a fluid as the result of varying temperatures or the rotation of the vessel in which the fluid is contained. These currents were made visible, as they occur in a large mass of water, by means of a few drops of hectograph ink, which at first spreads itself out in radiating lines over the surface, then sinks in the form of threads and columns, and, following the direction of the currents in the fluid, presents an extremely interesting appearance of rotatory formations.—Dr. Richarz has closely studied what takes place in an electrolyzing cell during the decomposition of water in the immediate neighbourhood of the electrodes during the passage of the currents of electrolytic convection. As is well known, an electromotive force of 1·5 Daniell is necessary in order that the current may pass electrolytically and the water be decomposed; if the electromotive force is less than the above, the water is not decomposed, but at the same time it can be shown that the electricity does traverse the fluid. According to Von Helmholtz's views on electrolysis, when the electromotive force is small, currents of electrolytic convection pass through the fluid, which are kept up by the occlusion of the positively charged hydrogen atoms at the kathode and by the neutral oxygen in solution. Starting from the work of Moritz Traube, who has proved the formation of hydrogen peroxide at the kathode in the electrolyzing cell, Dr. Richarz has been able to prove, both qualitatively and quantitatively, the formation of hydrogen peroxide at the kathode during the passage of convection currents. This formation of the peroxide takes place, according to the views of the speaker, by the union of two atoms of the occluded hydrogen with the neutral molecule of the dissolved oxygen, which has given up its positive charge to the kathode. As the result of this separation of the occluded hydrogen, fresh portions of hydrogen can be occluded by the metal of the electrode, and in this way a renewal of the electric current can take place.—Prof. Neesen described a vapour-calorimeter, consisting of a glass vessel into the centre of which projects a glass tube, closed at the lower end, for the reception of the substance under investigation. This tube is surrounded with a mass of lamp-wick, which is saturated with ether, and dips into a small quantity of liquid ether in the bottom of the outer vessel. Another glass vessel, exactly similar to the above, is joined to it by means of a capillary U-tube, in which a small drop of ether serves as an index. When a warm substance is dropped into the calorimeter, an amount of ether is converted into vapour proportional to the heat given up, and the volume of this vapour, as measured by the displacement of the ether index, gives the heat yielded by the substance. Prof. Neesen is still engaged in testing and improving the calorimeter, and only made the above preliminary communication as this was the last meeting of the Society before the summer vacation.—Dr. Grunmach exhibited a double quartz plate, which was not made of a right- and left-handed quartz plate, but was cut from a twin crystal, in which the fusion of the two crystals is so perfect that every slice cut from this twin crystal may be used as a double plate in the polarizing apparatus.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Walks in the Ardennes: J. W. Richards (Low).—Welsh Question and Druidism, Third Edition: Griffith (R. Banks).—Annual Report of the Department of Revenue, Settlement, and Agriculture, for 1885–86 (Madras).—Journal of the Royal Statistical Society, June (Stanford).—Journal of Physiology, vol. viii. No. 2 (Cambridge).—The Indian Forester, vols. ii., iv., vi., vii., viii. (Calcutta).—Annalen der Physik und Chemie, 1887, No. 8^{a} (Leipzig).—Museum d'Histoire Naturelle des Pays-Bas, tome ix. Catalogue Ostéologique des Mammifères: F. A. Jentink (Brill, Leide).

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